

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9 VAC 25-260. The proposed discharge will result from the operation of a sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
Fork Union Military Academy STP
PO Box 278
Fork Union, VA 23055
Location: 765 Academy Road
2. Permit No. VA0024147; Expiration Date: June 30, 2012
3. Owner: Fork Union Military Academy
Contact Name: LTC Todd M. Giszack
Title: Assistant to the President
Telephone No: (434) 842-4321
4. Description of Treatment Works Treating Domestic Sewage:
Total Number of Outfalls – 1

The facility serves a military academy with dormitories, staff housing, and dining hall as well as a motor lodge with a restaurant. All of these facilities are owned by the academy. The treatment units comprising the STP are shown in the schematics included in the permit reissuance application.

Average Discharge Flow (January 2012 – February 2011) = 0.024 MGD
Design Average Flow = 0.099 MGD

5. Application Complete Date: January 1, 2012

Permit Writer: Kate B. Harrigan	Date: April 30, 2012
Reviewed By: Dawn Jeffries	Date: May 2, 2012

Public Comment Period: May 24, 2012 to June 23, 2012

6. Receiving Stream Name: North Creek
River Mile: Outfall 002: 3.52
Use Impairment: Yes
Special Standards: None
Tidal Waters: No
Watershed Name: VAC – H20R James River/Bear Garden/South Creek
Basin: James (Middle); Subbasin: N/A
Section: 10; Class: III
7. Operator License Requirements per 9 VAC 25-31-200.C: Class III
8. Reliability Class per 9 VAC 25-790: Class II (assigned April 12, 1982)

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

9. Permit Characterization:

- ☒ Private ☐ Federal ☐ State ☐ POTW ☐ PVOTW
☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9 VAC 25-260-30:

Tier Designation: North Creek: Tier 1

The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. North Creek, in the vicinity of the discharge, is determined to be a Tier 1 water because North Creek is listed as impaired for aquatic life (benthics). Antidegradation baselines are not calculated for Tier 1 waters.

12. Site Inspection: Performed by Noel Thomas on February 29, 2012

13. Effluent Screening and Effluent Limitations: Appendix B

14. Effluent toxicity testing requirements included per 9 VAC 25-31-220.D: ☐ Yes ☒ No

If "No," check one:

- ☒ Municipal: This facility does not have a design flow ≥ 1.0 MGD, has no Significant Industrial Users (SIUs) or Categorical Industrial Users (CIUs), and is not deemed to have the potential to cause or contribute to instream toxicity.
- ☐ Industrial: This facility's SIC Code(s) and activities contributing wastewater do not fall within the categories for which aquatic toxicity monitoring is required, the facility does not have an IWC = 33%, and the discharge is not deemed to have the potential to cause or contribute to instream toxicity.

15. Sewage sludge utilization and disposal options include the following:

- transport of sewage sludge to the Old Dominion Landfill for disposal

16. Bases for Special Conditions: Appendix C

17. Material Storage per 9 VAC 25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

18. Antibacksliding Review per 9 VAC 25-31-220.L: This permit complies with Antibacksliding provisions of the VPDES Permit Regulation.

19. Impaired Use Status Evaluation per 9 VAC 25-31-220.D: The facility discharges directly to North Creek. The stream segment receiving the effluent is listed for aquatic life (benthics). A TMDL for this impairment has not been approved. The permit contains a re-opener condition that may allow the permit limits to be modified, in compliance with section 303(d)(4) of the Act once a TMDL is approved.

20. Regulation of Users per 9 VAC 25-31-280.B.9: There are no individual users contributing to the treatment works.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

21. Storm Water Management per 9 VAC 25-31-120: Application Required? ☐ Yes ☒ No

If “No,” check one:

- ☒ STPs: This facility does not have a design flow ≥ 1.0 MGD, nor is it required to have an approved POTW pretreatment program under 9 VAC 25-31-10 et seq.
- ☐ Others: This facility's SIC Code(s) and activities do not fall within the categories for which a Storm Water Application submittal is required.

22. Compliance Schedule per 9 VAC 25-31-250: In an email dated May 12, 2012, the permittee indicated they did not need a schedule of compliance for the more stringent copper limits or the new zinc limits which are now included at the 0.060 MGD flow tier.

23. Variances/Alternative Limits or Conditions per 9 VAC 25-31-280.B, 100.J, 100.P, and 100.M: None

24. Financial Assurance Applicability per 9 VAC 25: N/A – This facility does not serve private residences that are not owned by the permittee.

25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☒ No

26. Nutrient Trading Regulation per 9 VAC 25-820: See Appendix B
General Permit Required: ☐ Yes ☒ No

27. Threatened and Endangered (T&E) Species Screening per 9 VAC 25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows and because DGIF and DCR did not request to review the permit, T&E screening is not required.

28. Public Notice Information per 9 VAC 25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Kate Harrigan at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7850, kathleen.harrigan@deq.virginia.gov.

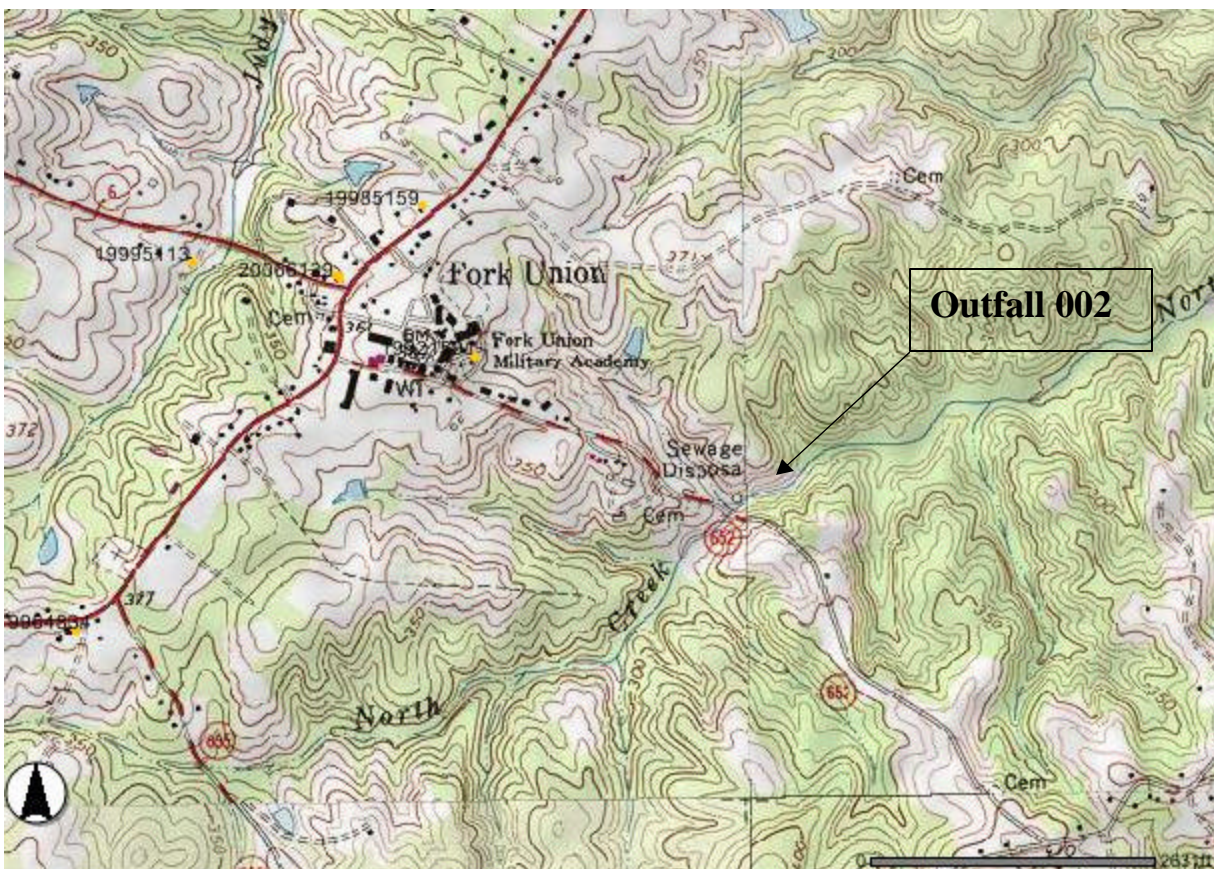
Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

29. Historical Record: The original permit was issued September 1, 1975. The design flow was 0.075 MGD. On October 26, 1996, a liner that met the required coefficient of permeability of no more than 10^{-6} cm/second was installed. On December 14, 2000, the SWCB approved a Consent Special Order that required the facility be upgraded. On August 9, 2004, DEQ issued a CTO for the 0.099 MGD facility. On August 31, 2004, Outfall 001, located at RM 3.52 was taken out of service as flows were diverted to Outfall 002. Additional flow tiers of 0.060 MGD and 0.075 MGD were included at the 2007 reissuance.

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

Fork Union Military Academy STP discharges to North Creek in Fluvanna County. The topographic map below shows the location of the treatment facility and Outfall 002.



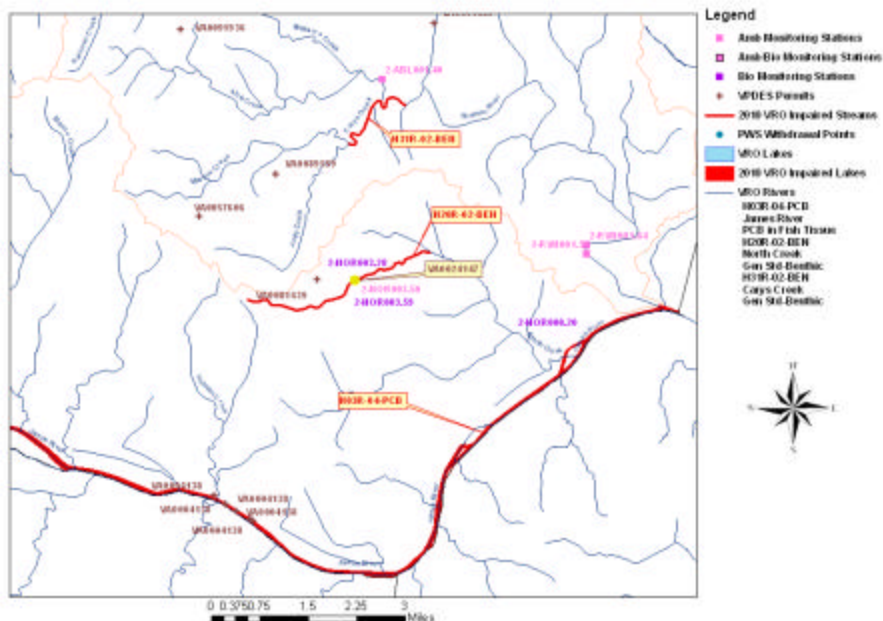
Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessment Review table and corresponding map below.

WATER QUALITY ASSESSMENTS REVIEW						
MIDDLE JAMES RIVER BASIN						
2/15/2012						
IMPAIRED SEGMENTS						
SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER	
H03R-04-PCB	James River	233.49	159.02	74.47	PCB in Fish Tissue	
H20R-02-BEN	North Creek	3.95	.70	3.25	Benthic	
H31R-02-BEN	Carys Creek	1.69	0.00	1.69	Benthic	
PERMITS						
PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0024147	Fork Union Military Academy	North Creek	3.52	374527	781501	VAC-H20R
VA0081639	Envoy at the Village	North Creek X-Trib	0.60	374528	781540	VAC-H20R
VA0004138	Dominion - Bremono Power	James River	175.89	374230	781721	VAC-H20R
VA0057606	Omohundro Well WTP	Martin Creek X Trib	0.39	374621	781739	VAV-H31R
VA0071692	Carysbrook Holdings LLC	Rivanna River	9.95	374855	781337	VAV-H31R
VA0089559	Morris Well WTP	Martins Creek X-Trib	0.47	374654	781621	VAV-H31R
VA0091936	Kingsbridge STP	Able Creek UT	0.79	374853	781755	VAV-H31R
MONITORING STATIONS						
STREAM	NAME	RIVER MILE	RECORD	LAT	LONG	
James River	2-JMS176.63	176.63	9/23/99	374416	781809	
Rivanna River	2-RVN001.64	1.64	3/24/70	374550	781106	
North Creek	2-NOR003.50	3.5	6/20/00	374527	781501	
Unnamed Tributary c	2-XXN000.02	0.02	6/20/00	374528	781021	
Able Creek	2-ABL001.40	1.4	7/2003	374810	781432	
Rivanna River	2-RVN001.55	1.55	5/13/04	374546	781105	
North Creek	2-NOR000.20	0.02	6/2/99	374443	781223	
North Creek	2-NOR003.28	3.28	6/2/99	374527	781458	
North Creek	2-NOR003.59	3.59	6/20/00	374525	781502	
PUBLIC WATER SUPPLY INTAKES						
OWNER	STREAM	RIVER MILE				
WATER QUALITY MANAGEMENT PLANNING REGULATION						
Is this discharge addressed in the WQMP regulation? Yes						
If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?						
PARAMETER	ALLOCATION					
BOD5	14.07 kg/d					
WATERSHED NAME						
VAV-H20R James River/Bear Garden Creek/South Creek						

**Fork Union Military Academy - Water Quality Assessments Review
February 15, 2012**



Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

FLOW FREQUENCY DETERMINATION

**MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE**

4411 Early Road – P.O. Box 3000

Harrisonburg, VA 22801

SUBJECT: Flow Frequency Determination
Fork Union Military Academy STP – VPDES Permit No. VA0024147, Fluvanna County
TO: Permit Processing File
FROM: Kate Harrigan
DATE: May 7, 2012

This memo supersedes Brandon Kiracofe's flow frequency determination dated December 15, 2006.

Fork Union Military Academy STP discharges to North Creek at Fork Union, VA. Stream flow frequencies are required above the discharge point for use by the permit writer in developing effluent limitations for the VPDES permit reissuance.

The VDEQ conducted flow measurements on North Creek from 1990 to 2001. The measurements were made upstream of the Fork Union Military Academy STP outfall. The measurements were correlated with the same-day daily mean values from the continuous record gage on Fine Creek at Fine Creek Mills, VA (#02036500). The correlation was done by plotting the measurements and the daily mean values on a log/log graph, and performing a regression analysis. The measurements correlated well with the Fine Creek gage. A best-fit line (and equation) for the data set was established. The required flow frequencies for the measurement site were then calculated using the equation of the line and the flow frequencies for the entire period of record of the Fine Creek gage.

The critical flows at the Fork Union Military Academy STP Outfall 002 were determined by projecting the measurement site flows downstream. This analysis does not address any other discharges, withdrawals, or springs located upstream of Outfall 002.

The data for the reference gage, the measurement site, and Outfall 002 are presented below:

Fine Creek at Fine Creek Mills, VA (#02036500):

Drainage Area = 22.1 mi²

1Q30 = 0.09 cfs	High Flow 1Q10 = 2.5 cfs
1Q10 = 0.24 cfs	High Flow 7Q10 = 3.1 cfs
7Q10 = 0.30 cfs	High Flow 30Q10 = 5.8 cfs
30Q10 = 0.53 cfs	HM = 3.7 cfs
30Q5 = 0.98 cfs	

North Creek at Fork Union, VA (#02030760) measurement site:

Drainage Area = 2.0 mi²

1Q30 = 0.026 cfs	High Flow 1Q10 = 0.238 cfs
1Q10 = 0.050 cfs	High Flow 7Q10 = 0.274 cfs
7Q10 = 0.058 cfs	High Flow 30Q10 = 0.415 cfs
30Q10 = 0.085 cfs	HM = 0.308 cfs
30Q5 = 0.128 cfs	

North Creek at Outfall 002:

Drainage Area = 2.013 mi²

1Q30 = 0.0171 mgd	High Flow 1Q10 = 0.1510 mgd
1Q10 = 0.0322 mgd	High Flow 7Q10 = 0.1812 mgd
7Q10 = 0.0372 mgd	High Flow 30Q10 = 0.2331 mgd
30Q10 = 0.0554 mgd	HM = 0.2013 mgd
30Q5 = 0.0835 mgd	

The high flow months are December through May.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

0.060 MGD Annual Mix	0.060 MGD Wet Mix
<p>Stream 7Q10 = 0.0372 MGD Stream 30Q10 = 0.0554 MGD Stream 1Q10 = 0.0322 MGD Stream slope = 0.092329545 ft/ft Stream width = 2.5 ft Bottom scale = 5 Channel scale = 1</p> <hr/> <p>Mixing Zone Predictions @ 7Q10 Depth = .1063 ft Length = 23.68 ft Velocity = .566 ft/sec Residence Time = .0005 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 30Q10 Depth = .1183 ft Length = 21.54 ft Velocity = .6041 ft/sec Residence Time = .0004 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 1Q10 Depth = .1029 ft Length = 24.38 ft Velocity = .5548 ft/sec Residence Time = .0122 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>	<p>Stream 7Q10 = 0.1812 MGD Stream 30Q10 = 0.2331 MGD Stream 1Q10 = 0.1510 MGD Stream slope = 0.092329545 ft/ft Stream width = 3.5 ft Bottom scale = 5 Channel scale = 1</p> <hr/> <p>Mixing Zone Predictions @ 7Q10 Depth = .1499 ft Length = 34.84 ft Velocity = .7115 ft/sec Residence Time = .0006 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 30Q10 Depth = .1692 ft Length = 31.28 ft Velocity = .7661 ft/sec Residence Time = .0005 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 1Q10 Depth = .1379 ft Length = 37.54 ft Velocity = .6762 ft/sec Residence Time = .0154 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>
0.075 MGD Annual Mix	0.075 MGD Wet Mix
<p>Stream 7Q10 = 0.0372 MGD Stream 30Q10 = 0.0554 MGD Stream 1Q10 = 0.0322 MGD Stream slope = 0.092329545 ft/ft Stream width = 2.5 ft Bottom scale = 5 Channel scale = 1</p> <hr/> <p>Mixing Zone Predictions @ 7Q10 Depth = .1162 ft Length = 21.89 ft Velocity = .5978 ft/sec Residence Time = .0004 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 30Q10 Depth = .1276 ft Length = 20.14 ft Velocity = .6328 ft/sec Residence Time = .0004 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 1Q10 Depth = .113 ft Length = 22.44 ft Velocity = .5874 ft/sec Residence Time = .0106 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>	<p>Stream 7Q10 = 0.1812 MGD Stream 30Q10 = 0.2331 MGD Stream 1Q10 = 0.1510 MGD Stream slope = 0.092329545 ft/ft Stream width = 3.5 ft Bottom scale = 5 Channel scale = 1</p> <hr/> <p>Mixing Zone Predictions @ 7Q10 Depth = .1556 ft Length = 33.71 ft Velocity = .7281 ft/sec Residence Time = .0005 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 30Q10 Depth = .1745 ft Length = 30.43 ft Velocity = .7806 ft/sec Residence Time = .0005 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <hr/> <p>Mixing Zone Predictions @ 1Q10 Depth = .144 ft Length = 36.11 ft Velocity = .6941 ft/sec Residence Time = .0145 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

0.099 MGD Annual Mix	0.099 MGD Wet Mix
<p>Stream 7Q10 = 0.0372 MGD Stream 30Q10 = 0.0554 MGD Stream 1Q10 = 0.0322 MGD Stream slope = 0.092329545 ft/ft Stream width = 2.5 ft Bottom scale = 5 Channel scale = 1</p> <p>-----</p> <p>Mixing Zone Predictions @ 7Q10 Depth = .131 ft Length = 19.67 ft Velocity = .6432 ft/sec Residence Time = .0004 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 30Q10 Depth = .1418 ft Length = 18.31 ft Velocity = .6741 ft/sec Residence Time = .0003 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 1Q10 Depth = .128 ft Length = 20.07 ft Velocity = .6342 ft/sec Residence Time = .0088 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>	<p>Stream 7Q10 = 0.1812 MGD Stream 30Q10 = 0.2331 MGD Stream 1Q10 = 0.1510 MGD Stream slope = 0.092329545 ft/ft Stream width = 3.5 ft Bottom scale = 5 Channel scale = 1</p> <p>-----</p> <p>Mixing Zone Predictions @ 7Q10 Depth = .1645 ft Length = 32.07 ft Velocity = .7531 ft/sec Residence Time = .0005 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 30Q10 Depth = .1829 ft Length = 29.18 ft Velocity = .803 ft/sec Residence Time = .0004 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.</p> <p>-----</p> <p>Mixing Zone Predictions @ 1Q10 Depth = .1533 ft Length = 34.16 ft Velocity = .7213 ft/sec Residence Time = .0132 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.</p>

APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 002

Final Limits

Design Flow: 0.060 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Average		-----	-----
CBOD ₅ (Jun-Nov)	3,4,5	12 mg/L	2.7 kg/d	18 mg/L	4.1 kg/d	1/Week	4 HC
CBOD ₅ (Dec-May)	2,3,4,5	25 mg/L	5.7 kg/d	40 mg/L	9.1 kg/d	1/Week	4 HC
Ammonia-N (Jun-Nov)(mg/L)	1,3	6.7		6.7		1/Month	4 HC
TSS	1	30 mg/L	6.8 kg/d	45 mg/L	10 kg/d	1/Month	4 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.013		0.016		3/Day at 4-hr intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 2 /Week** 10 am to 4 pm	Grab
Copper, TR (µg/L)	3	18		18		1/Month	4 HC
Zinc, TR (µg/L)	3	160		160		1/Month	4.HC
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	2,3	6.0		9.0		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.6		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,5	1.0		NA		3/Day at 4-hr intervals	Grab
Total Hardness (as CaCO ₃)(mg/L)	5	NL		NA		1/Quarter	4 HC

NL = No Limitation, monitoring required

NA = Not Applicable

TIRE = Totalizing, Indicating, and Recording equipment

4 HC = 4-Hour Composite

4/Month = 4 samples taken monthly, with at least 1 sample taken each calendar week

2/Week = 2 samples taken during the calendar week, no less than 48 hours apart

* = Applicable only when chlorination is used for disinfection

** = Applicable if an alternative to chlorination is used for disinfection.

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9 VAC 25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9 VAC 25-260)
4. DEQ Regional Stream Model
5. Best Professional Judgment (BPJ)

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Outfall 002

Final Limits

Design Flow: 0.075 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Average		-----	-----
cBOD ₅ (Jun-Dec)	3,4,5	12 mg/L	3.4 kg/d	18 mg/L	5.1 kg/d	1/Week	4 HC
cBOD ₅ (Jan-May)	2,3,4,5	25 mg/L	7.1 kg/d	40 mg/L	11 kg/d	1/Week	4 HC
Ammonia-N (Jun-Nov)(mg/L)	1,3	5.9		5.9		1/Month	4 HC
TSS	1	30 mg/L	8.5 kg/d	45 mg/L	13 kg/d	1/Month	4 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.012		0.014		3/Day at 4-hr intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 2/Week** 10 am to 4 pm	Grab
Copper, TR (µg/L)	3	17		17		1/Month	4 HC
Zinc, TR (µg/L)	3	150		150		1/Month	4 HC
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	2,3	6.0		9.0		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.6		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,5	1.0		NA		3/Day at 4-hr intervals	Grab
Total Hardness (as CaCO ₃)(mg/L)	5	NL		NA		1/Quarter	4 HC

NL = No Limitation, monitoring required

NA = Not Applicable

TIRE = Totalizing, Indicating, and Recording equipment

4 HC = 4-Hour Composite

4/Month = 4 samples taken monthly, with at least 1 sample taken each calendar week

2/Week = 2 samples taken during the calendar week, no less than 48 hours apart

* = Applicable only when chlorination is used for disinfection

** = Applicable if an alternative to chlorination is used for disinfection.

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9 VAC 25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9 VAC 25-260)
4. DEQ Regional Stream Model
5. Best Professional Judgment (BPJ)

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Outfall 002

Final Limits

Design Flow: 0.099 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Average		-----	-----
cBOD ₅ (Jun-Dec)	3,4,5	11 mg/L	4.1 kg/d	16 mg/L	6.0 kg/d	1/Week	4 HC
cBOD ₅ (Jan-May)	2,3,4,5	25 mg/L	9.4 kg/d	40 mg/L	15 kg/d	1/Week	4 HC
Ammonia-N (Jun-Nov)(mg/L)	1,3	5.0		5.0		1/Month	4 HC
TSS	1	30 mg/L	11 kg/d	45 mg/L	17 kg/d	1/Month	4 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.011		0.013		3/Day at 4-hr intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 2/Week** 10 am to 4 pm	Grab
Copper, TR (µg/L)	3	16		16		1/Month	4 HC
Zinc, TR (µg/L)	3	120		120		1/Month	4.HC
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	2,3	6.0		9.0		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.6		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,5	1.0		NA		3/Day at 4-hr intervals	Grab
Total Hardness (as CaCO ₃)(mg/L)	5	NL		NA		1/Quarter	4 HC

NL = No Limitation, monitoring required

NA = Not Applicable

TIRE = Totalizing, Indicating, and Recording equipment

4 HC = 4-Hour Composite

4/Month = 4 samples taken monthly, with at least 1 sample taken each calendar week

2/Week = 2 samples taken during the calendar week, no less than 48 hours apart

* = Applicable only when chlorination is used for disinfection

** = Applicable if an alternative to chlorination is used for disinfection.

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9 VAC 25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9 VAC 25-260)
4. DEQ Regional Stream Model
5. Best Professional Judgment (BPJ)

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

LIMITING FACTORS – OVERVIEW:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9 VAC 25-720)	
A. TMDL limits	None
B. Non-TMDL WLAs	BOD₅
C. CBP (TN & TP) WLAs	None
Federal Effluent Guidelines	cBOD₅, TSS, pH
BPJ/Agency Guidance limits	TRC (contact)
Water Quality-based Limits - numeric	cBOD₅, DO, TKN, Ammonia-N, TRC (effluent), E. coli, pH, Cadmium, Copper, Zinc
Water Quality-based Limits - narrative	None
Technology-based Limits (9 VAC 25-40-70)	None
Whole Effluent Toxicity (WET)	Not applicable
Storm Water Limits	Not applicable

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:

This discharge is included in the North Creek DO model maintained by the DEQ-Valley Regional Office, which is available for review by visitation or electronically upon request.

The DO model demonstrated that the values shown below are protective:

	0.060 MGD		0.075 MGD		0.099 MGD	
	(Jun-Nov)	(Dec-May)	(Jun-Nov)	(Dec-May)	(Jun-Nov)	(Dec-May)
cBOD ₅ (mg/L)	12	25	12	25	11	25
TKN (mg/L)	7.4	12.5	6.8	12.5	6.3	12.5
DO (mg/L)	7.6	7.6	7.6	7.6	7.6	7.6

cBOD₅ limits have been carried forward from the previous reissuance. This discharge is identified in the WQMP Regulation and has been allocated 14.07 kg BOD₅ per day for the discharge to North Creek. The effluent limits for oxygen demanding substances are expressed as cBOD₅ instead of BOD₅ (nBOD₅ + cBOD₅), however, if the cBOD₅ was as much as the highest BOD₅ allowed (30 mg/L), at the current design flow (0.099 MGD) the discharge would remain in conformance with the WQMP waste load allocation (WLA).

TKN (Jun-Nov) limits were removed at this reissuance and replaced with Ammonia-N (Jun-Nov) limits. This does not violate antibacksliding requirements because the modeled effluent TKN was more than two times the Ammonia-N WLA and it was determined that the Ammonia -N limits imposed in this permit will control TKN at concentrations lower than previously permitted. TKN (Dec-May) limits were determined to not be necessary because the effluent data submitted during the previous permit indicates the facility is consistently achieving TKN concentrations that are less than 10% of the modeled TKN (Dec-May) value.

The TSS limits are consistent with the Secondary Treatment Regulation and have been carried forward from the previous permit.

The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

EVALUATION OF THE EFFLUENT – DISINFECTION:

This facility currently utilizes UV disinfection. The monitoring frequency for E. coli has been revised from 1/Week to 2/Week in accordance with current guidance. Chlorine limits are also specified in the permit, but are only applicable should the facility need to utilize chlorine disinfection. An E. coli limit with 4/Month monitoring is required if chlorination is utilized for disinfection.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

The design average flow for the facility as it existed on or before July 1, 2005 is 0.099 MGD. The design of this treatment works did not take into consideration the need for nutrient removal.

The “permitted design capacity” or “permitted capacity” in terms of annual mass load of total nitrogen or total phosphorous discharged by this non-significant discharger is assumed to be that achieved at the current design flow using the currently installed technology.

Future nutrient limitations may apply to this facility. For the sole purpose of establishing the current mass load of nutrients discharged from this facility, it is recognized that the design flow is 0.099 MGD (see above) and the technology installed for treating domestic sewage did not intentionally consider nutrient removal.

Pursuant to section 62.1-44.19:12 - :19 of the law, Total Nitrogen (TN) and Total Phosphorus (TP) baselines are being established for this facility to represent nutrient discharge allowances as of July 1, 2005. Once established, these baselines will be used as a limiting factor should the facility ever expand or have a significant increase in effluent TN or TP concentrations. For municipal facilities, the baselines are based on the permitted design capacity of the facility. The permitted design capacity is defined as

Total N or P (lb/yr) = concentration (mg/L) x design flow (MGD) x 8.3438 x 365 (days/yr)

where

Design flow – as of July 1, 2005, the approved flow was 0.099 MGD

Concentration – the treatment provided as of July 1, 2005 was TN = 18.7 mg/L and TP = 2.5 mg/L (assumed concentrations based on secondary treatment facility)

0.099 MGD

TN = 18.7 mg/L x 0.099 MGD x 8.3438 x 365 days/yr = 5,638 lb/yr

TP = 2.5 mg/L x 0.099 MGD x 8.3438 x 365 days/yr = 754 lb/yr

EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 2CXB005.39 at the Route 660 Bridge on Cunningham Creek and have been carried forward since no new data was available. A Flow Frequency Determination for the receiving stream was generated April 15, 2012, and is included in Appendix A. The “Wet Season” or “High Flow” months are December through May.

Stream Information			
90% Annual Temp (°C) =	22	90% pH (SU) =	7.7
90% Wet Temp (°C) =	12.8	10% pH (SU) =	6.3
Mean Hardness (mg/L) =	50		

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Discharge: The pH and temperature values were obtained from data submitted by the permittee. The hardness value has been carried forward from the previous permit.

Effluent Information			
90% Annual Temp (°C) =	26	90% pH (SU) =	7.9
90% Wet Temp (°C) =	21	10% pH (SU) =	7.3
Mean Hardness (mg/L) =	105.6		

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- TRC: Slightly more stringent TRC limits have been included based on new stream flow data. Because the facility currently utilizes UV disinfection, a compliance schedule for meeting the more stringent limits has not been included.
- Ammonia-N: Ammonia-N (Dec-May) limits were removed. This does not violate antibacksliding requirements because removal of the limits is based on new effluent temperature and pH data. Ammonia-N (Jun-Nov) limits were determined to be necessary at this reissuance and have replaced the previous TKN (Jun-Nov) limits. No compliance schedule has been included for the new Ammonia-N limits because based on existing effluent data, the facility can consistently meet the new limits.
- Metals:
 - Cadmium: New effluent data for cadmium were available during this reissuance. Based on the evaluation using the new effluent data obtained during the term of the previous permit along with the datum from the previous permit that resulted in the determination that limits were required, no limits were determined to be necessary for cadmium at this reissuance; therefore, the limits and monitoring of the previous permit have been removed. If the new effluent information had been available at the previous reissuance, it would have been determined that there was not a reasonable potential for cadmium to violate WQS.
 - Copper: More stringent copper limits were determined to be necessary at the 0.060 MGD and 0.075 MGD flow tiers. The copper limit at the 0.099 MGD tier was determined to be the same as in the previous permit and has been carried forward.
 - Zinc: Limits for zinc were imposed at the previous reissuance at the 0.099 MGD flow tier. Less stringent zinc limits were determined to be necessary at the 0.099 MGD tier at this reissuance; however, the previous limits were carried forward to comply with antibacksliding requirements. At this reissuance, limits for zinc were determined to be necessary at the 0.060 MGD and the 0.075 MGD flow tiers.
- ? Hardness: Monitoring for hardness has been included at this reissuance per BPJ in order to obtain more data on this effluent characteristic that is used in determining limits for metals.

Additional monitoring data is needed for a number of pollutants due to the lack of effluent quality data. The permittee must monitor the effluent at Outfall 002 for the substances noted in Attachment A of the permit within one year of the permit's effective date.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

WQC-WLA SPREADSHEET INPUT – 0.060 MGD

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS									
Facility Name: Fork Union Military Academy STP					Permit No.: VA0024147				
Receiving Stream: North Creek					Date: 5/7/2012				
					Version: OWP Guidance Memo 00-2011 (8/24/00)				

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	50 mg/L	1Q10 (Annual) =	0.0322 MGD	Annual	- 1Q10 Flow = 100 %	Mean Hardness (as CaCO3) =	105.6 mg/L
90% Temperature (Annual) =	22 deg C	7Q10 (Annual) =	0.0372 MGD		- 7Q10 Flow = 100 %	90% Temp (Annual) =	26 deg C
90% Temperature (Wet season) =	12.8 deg C	30Q10 (Annual) =	0.0554 MGD		- 30Q10 Flow = 100 %	90% Temp (Wet season) =	21 deg C
90% Maximum pH =	7.7 SU	1Q10 (Wet season) =	0.151 MGD	Wet Season	- 1Q10 Flow = 100 %	90% Maximum pH =	7.9 SU
10% Maximum pH =	6.3 SU	30Q10 (Wet season) =	0.2331 MGD		- 30Q10 Flow = 100 %	10% Maximum pH =	7.3 SU
Tier Designation =	1	30Q5 =	0.0835 MGD			Current Discharge Flow =	0.060 MGD
Public Water Supply (PWS) Y/N? =	N	Harmonic Mean =	0.213 MGD			Discharge Flow for Limit Analysis =	0.060 MGD
V(alley) or P(edmont)? =	V						
Trout Present Y/N? =	N						
Early Life Stages Present Y/N? =	Y						

Footnotes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
- All flow values are expressed as Million Gallons per Day (MGD).
- Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
- Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.
- "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
- Carcinogen "Y" indicates carcinogenic parameter.
- Ammonia WQSs selected from separate tables, based on pH and temperature.
- Metals measured as Dissolved, unless specified otherwise.
- WLA = Waste Load Allocation (based on standards).
- WLA = Waste Load Allocation (based on standards).
- WLAs are based on mass balances (less background, if data exist).
- Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
- Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
- Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
- Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQC-WLA SPREADSHEET OUTPUT – 0.060MGD

Facility Name:	Permit No.:																							
Fork Union Military Academy STP	VA0024147	WATER QUALITY CRITERIA							WATER QUALITY CRITERIA							NON-ANTIDEGRADATION								
Receiving Stream:	Date:	0.060 MGD Discharge Flow - 100% Stream Mix										0.060 MGD Discharge Flow - Mix per "Mixer"										WASTE LOAD ALLOCATIONS		
North Creek	5/7/2012	Human Health										Human Health										0.060 MGD Discharge - Mix per "Mixer"		
Toxic Parameter and Form	Carcinogen?	Aquatic Protection		Public Water	Other Surface	INSTREAM BASELINES				Aquatic Protection		Public Water	Other Surface	Aquatic Protection		Public Water	Other Surface							
		Acute	Chronic	Supplies	Waters	Acute	Chronic	H-Health	Acute	Chronic	Supplies	Waters	Acute	Chronic	Supplies	Waters	Acute	Chronic	Health					
Ammonia-N (Annual)	N	1.2E+01 n	1.7E+00 mg/L	None	None	2.9E+00 mg/L	4.3E-01 mg/l	None	1.2E+01 mg/L	1.7E+00 mg/L	None	None	1.8E+01 mg/L	3.3E+00 mg/L	N/A									
Ammonia-N (Wet Season)	N	1.3E+01 n	3.4E+00 mg/L	None	None	3.3E+00 mg/L	8.6E-01 mg/l	None	1.3E+01 mg/L	3.4E+00 mg/L	None	None	4.7E+01 mg/L	1.7E+01 mg/L	N/A									
Cadmium	N	3.3E+00	9.9E-01	5.0E+00	None	8.3E-01	2.5E-01	None	3.3E+00	9.9E-01	5.0E+00	None	5.1E+00	1.6E+00	N/A									
Chlorine, Total Residual	N	1.9E-02 n	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/l	None	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.9E-02 mg/L	1.8E-02 mg/L	N/A									
Copper	N	1.2E+01	7.7E+00	1.3E+03	None	2.9E+00	1.9E+00	None	1.2E+01	7.7E+00	1.3E+03	None	1.8E+01	1.3E+01	N/A									
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	5.0E+00	1.3E+00	4.2E+02	2.0E+01	5.0E+00	1.7E+02	4.2E+03	3.1E+01	8.1E+00	1.0E+04									
Silver	N	2.7E+00	None	None	None	6.7E-01	None	None	2.7E+00	None	None	None	4.1E+00	N/A	N/A									
Zinc	N	1.0E+02	1.0E+02	7.4E+03	2.6E+04	2.6E+01	2.6E+01	2.6E+03	1.0E+02	1.0E+02	7.4E+03	2.6E+04	1.6E+02	1.7E+02	6.2E+04									

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

WQC-WLA SPREADSHEET INPUT – 0.075 MGD

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS			
Facility Name:		Permit No.: VA0024147	
Fork Union Military Academy STP		Date: 5/7/2012	
Receiving Stream:		Version: OWP Guidance Memo 00-2011 (8/24/00)	
North Creek			
Stream Information		Stream Flows	
Mean Hardness (as CaCO3) =		1Q10 (Annual) =	
50 mg/L		0.0322 MGD	
90% Temperature (Annual) =		7Q10 (Annual) =	
22 deg C		0.0372 MGD	
90% Temperature (Wet season) =		30Q10 (Annual) =	
12.8 deg C		0.0554 MGD	
90% Maximum pH =		1Q10 (Wet season) =	
7.7 SU		0.151 MGD	
10% Maximum pH =		30Q10 (Wet season) =	
6.3 SU		0.2331 MGD	
Tier Designation =		30Q5 =	
1		0.0835 MGD	
Public Water Supply (PWS) Y/N? =		Harmonic Mean =	
N		0.213 MGD	
V(alley) or P(edmont)? =			
V			
Trout Present Y/N? =			
N			
Early Life Stages Present Y/N? =			
Y			
Mixing Information		Effluent Information	
Annual - 1Q10 Flow =		Mean Hardness (as CaCO3) =	
100 %		105.6 mg/L	
- 7Q10 Flow =		90% Temp (Annual) =	
100 %		26 deg C	
- 30Q10 Flow =		90% Temp (Wet season) =	
100 %		21 deg C	
Wet Season - 1Q10 Flow =		90% Maximum pH =	
100 %		7.9 SU	
- 30Q10 Flow =		10% Maximum pH =	
100 %		7.3 SU	
		Current Discharge Flow =	
		0.075 MGD	
		Discharge Flow for Limit Analysis =	
		0.075 MGD	
Footnotes:			
1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.			
2. All flow values are expressed as Million Gallons per Day (MGD).			
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.			
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.			
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.			
6. Carcinogen "Y" indicates carcinogenic parameter.			
7. Ammonia WQSs selected from separate tables, based on pH and temperature.			
8. Metals measured as Dissolved, unless specified otherwise.			
9. WLA = Waste Load Allocation (based on standards).			
10. WLA = Waste Load Allocation (based on standards).			
11. WLAs are based on mass balances (less background, if data exist).			
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.			
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.			
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.			
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).			

WQC-WLA SPREADSHEET OUTPUT – 0.075 MGD

Facility Name:		Permit No.:															
Fork Union Military Academy STP		VA0024147															
		WATER QUALITY CRITERIA				WATER QUALITY CRITERIA				NON-ANTIDEGRADATION							
Receiving Stream:		Date:		0.075 MGD Discharge Flow - 100% Stream Mix				0.075 MGD Discharge Flow - Mix per "Mixer"				WASTE LOAD ALLOCATIONS					
North Creek		5/7/2012		Human Health				Human Health				0.075 MGD Discharge - Mix per "Mixer"					
				Aquatic Protection		Public Water Other Surface		INSTREAM BASELINES		Aquatic Protection		Public Water Other Surface		Aquatic Protection		Human	
Toxic Parameter and Form	Carcinogen?	Acute	Chronic	Supplies	Waters	Acute	Chronic	H-Health	Acute	Chronic	Supplies	Waters	Acute	Chronic	Health		
Ammonia-N (Annual)	N	1.2E+01 mg/L	1.7E+00 mg/L	None	None	2.9E+00 mg/L	4.2E-01 mg/L	None	1.2E+01 mg/L	1.7E+00 mg/L	None	None	1.6E+01 mg/L	2.9E+00 mg/L	N/A		
Ammonia-N (Wet Season)	N	1.3E+01 mg/L	3.4E+00 mg/L	None	None	3.3E+00 mg/L	8.4E-01 mg/L	None	1.3E+01 mg/L	3.4E+00 mg/L	None	None	3.9E+01 mg/L	1.4E+01 mg/L	N/A		
Cadmium	N	3.4E+00	1.0E+00	5.0E+00	None	8.6E-01	2.5E-01	None	3.4E+00	1.0E+00	5.0E+00	None	4.9E+00	1.5E+00	N/A		
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/L	None	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.7E-02 mg/L	1.6E-02 mg/L	N/A		
Copper	N	1.2E+01	8.0E+00	1.3E+03	None	3.0E+00	2.0E+00	None	1.2E+01	8.0E+00	1.3E+03	None	1.7E+01	1.2E+01	N/A		
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	5.0E+00	1.3E+00	4.2E+02	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.9E+01	7.5E+00	8.9E+03		
Silver	N	2.8E+00	None	None	None	7.0E-01	None	None	2.8E+00	None	None	None	4.0E+00	N/A	N/A		
Zinc	N	1.1E+02	1.1E+02	7.4E+03	2.6E+04	2.7E+01	2.6E+01	2.6E+03	1.1E+02	1.1E+02	7.4E+03	2.6E+04	1.5E+02	1.6E+02	5.5E+04		

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

WQC-WLA SPREADSHEET INPUT – 0.099 MGD

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS									
Facility Name: Fork Union Military Academy STP									
Receiving Stream: North Creek									
Permit No.: VA0024147									
Date: 5/7/2012									
Version: OWP Guidance Memo 00-2011 (8/24/00)									
Stream Information			Stream Flows			Mixing Information			Effluent Information
Mean Hardness (as CaCO3) =	50	mg/L	1Q10 (Annual) =	0.0322	MGD	Annual	- 1Q10 Flow =	100	%
90% Temperature (Annual) =	22	deg C	7Q10 (Annual) =	0.0372	MGD		- 7Q10 Flow =	100	%
90% Temperature (Wet season) =	12.8	deg C	30Q10 (Annual) =	0.0554	MGD		- 30Q10 Flow =	100	%
90% Maximum pH =	7.7	SU	1Q10 (Wet season) =	0.151	MGD	Wet Season	- 1Q10 Flow =	100	%
10% Maximum pH =	6.3	SU	30Q10 (Wet season) =	0.2331	MGD		- 30Q10 Flow =	100	%
Tier Designation =	1		30Q5 =	0.0835	MGD				
Public Water Supply (PWS) Y/N? =	N		Harmonic Mean =	0.213	MGD				
V(alley) or P(iedmont)? =	V								
Trout Present Y/N? =	N								
Early Life Stages Present Y/N? =	Y								
Effluent Information									
Mean Hardness (as CaCO3) =	105.6	mg/L							
90% Temp (Annual) =	26	deg C							
90% Temp (Wet season) =	21	deg C							
90% Maximum pH =	7.9	SU							
10% Maximum pH =	7.3	SU							
Current Discharge Flow =	0.099	MGD							
Discharge Flow for Limit Analysis =	0.099	MGD							
Footnotes:									
1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.									
2. All flow values are expressed as Million Gallons per Day (MGD).									
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.									
4. Hardness expressed as mg/l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO3.									
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.									
6. Carcinogen "Y" indicates carcinogenic parameter.									
7. Ammonia WQSS selected from separate tables, based on pH and temperature.									
8. Metals measured as Dissolved, unless specified otherwise.									
9. WLA = Waste Load Allocation (based on standards).									
10. WLA = Waste Load Allocation (based on standards).									
11. WLAs are based on mass balances (less background, if data exist).									
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.									
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.									
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows									
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).									

WQC-WLA SPREADSHEET OUTPUT – 0.099 MGD

Facility Name: Fork Union Military Academy STP		Permit No.: VA0024147		WATER QUALITY CRITERIA					WATER QUALITY CRITERIA					NON-ANTIDEGRADATION		
Receiving Stream: North Creek		Date: 5/7/2012		0.099 MGD Discharge Flow - 100% Stream Mix					0.099 MGD Discharge Flow - Mix per "Mixer"					WASTE LOAD ALLOCATIONS		
				Human Health					Human Health					0.099 MGD Discharge - Mix per "Mixer"		
				Public Water/Other Surface					Public Water/Other Surface					Aquatic Protection		
				Supplies Waters					Supplies Waters					Human Health		
				INSTREAM BASELINES					INSTREAM BASELINES							
Toxic Parameter and Form	Carcinogen?	Acute	Chronic	Acute	Chronic	H-Health	Acute	Chronic	H-Health	Acute	Chronic	Acute	Chronic	Acute	Chronic	Health
Acenaphthene	N	None	None	6.7E+02	9.9E+02	None	None	None	9.9E+01	None	None	6.7E+02	9.9E+02	N/A	N/A	1.8E+03
Acrolein	N	None	None	6.1E+00	9.3E+00	None	None	None	9.3E-01	None	None	6.1E+00	9.3E+00	N/A	N/A	1.7E+01
Acrylonitrile	Y	None	None	5.1E-01	2.5E+00	None	None	None	2.5E-01	None	None	5.1E-01	2.5E+00	N/A	N/A	7.9E+00
Aldrin	Y	3.0E+00	None	4.9E-04	5.0E-04	7.5E-01	None	None	5.0E-05	3.0E+00	None	4.9E-04	5.0E-04	4.0E+00	N/A	1.6E-03
Ammonia-N (Annual)	N	1.1E+01 mg/L	1.6E+00 mg/L	None	None	2.8E+00 mg/L	4.1E-01 mg/L	None	1.1E+01 mg/L	1.6E+00 mg/L	None	None	None	1.5E+01 mg/L	2.5E+00 mg/L	N/A
Ammonia-N (Wet Season)	N	1.3E+01 mg/L	3.2E+00 mg/L	None	None	3.2E+00 mg/L	8.1E-01 mg/L	None	1.3E+01 mg/L	3.2E+00 mg/L	None	None	None	3.2E+01 mg/L	1.1E+01 mg/L	N/A
Anthracene	N	None	None	8.3E+03	4.0E+04	None	None	None	4.0E+03	None	None	8.3E+03	4.0E+04	N/A	N/A	7.4E+04
Antimony	N	None	None	5.6E+00	6.4E+02	None	None	None	6.4E+01	None	None	5.6E+00	6.4E+02	N/A	N/A	1.2E+03
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	8.5E+01	3.8E+01	None	3.4E+02	1.5E+02	None	1.0E+01	None	4.5E+02	2.1E+02	N/A
Barium	N	None	None	2.0E+03	None	None	None	None	None	None	None	2.0E+03	None	N/A	N/A	N/A
Benzene	Y	None	None	2.2E+01	5.1E+02	None	None	None	5.1E+01	None	None	2.2E+01	5.1E+02	N/A	N/A	1.6E+03
Benzidine	Y	None	None	8.6E-04	2.0E-03	None	None	None	2.0E-04	None	None	8.6E-04	2.0E-03	N/A	N/A	6.3E-03
Benzo(a)anthracene	Y	None	None	3.8E-02	1.8E-01	None	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
Benzo(a)pyrene	Y	None	None	3.8E-02	1.8E-01	None	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
Benzo(b)fluoranthene	Y	None	None	3.8E-02	1.8E-01	None	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
Benzo(k)fluoranthene	Y	None	None	3.8E-02	1.8E-01	None	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
Bis(2-Chloroethyl) Ether	Y	None	None	3.0E-01	5.3E+00	None	None	None	5.3E-01	None	None	3.0E-01	5.3E+00	N/A	N/A	1.7E+01
Bis(2-Chloroisopropyl) Ether	N	None	None	1.4E+03	6.5E+04	None	None	None	6.5E+03	None	None	1.4E+03	6.5E+04	N/A	N/A	1.2E+05
Bis(2-Ethylhexyl) Phthalate	Y	None	None	1.2E+01	2.2E+01	None	None	None	2.2E+00	None	None	1.2E+01	2.2E+01	N/A	N/A	6.9E+01
Bromoform	Y	None	None	4.3E+01	1.4E+03	None	None	None	1.4E+02	None	None	4.3E+01	1.4E+03	N/A	N/A	4.4E+03
Butyl Benzyl Phthalate	N	None	None	1.5E+03	1.9E+03	None	None	None	1.9E+02	None	None	1.5E+03	1.9E+03	N/A	N/A	3.5E+03
Cadmium	N	3.6E+00	1.0E+00	5.0E+00	None	8.9E-01	2.6E-01	None	3.6E+00	1.0E+00	None	5.0E+00	None	4.7E+00	1.4E+00	N/A
Carbon Tetrachloride	Y	None	None	2.3E+00	1.6E+01	None	None	None	1.6E+00	None	None	2.3E+00	1.6E+01	N/A	N/A	5.0E+01
Chlordane	Y	2.4E+00	4.3E-03	8.0E-03	8.1E-03	6.0E-01	1.1E-03	None	8.1E-04	2.4E+00	4.3E-03	8.0E-03	8.1E-03	3.2E+00	5.9E-03	2.6E-02
Chloride	N	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 n	None	2.2E+02 mg/L	5.8E+01 mg/L	None	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 rr	None	None	1.1E+03 mg/L	3.2E+02 mg/L	N/A
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	4.8E-03 mg/L	2.8E-03 mg/L	None	1.9E-02 mg/L	1.1E-02 mg/L	None	None	None	2.5E-02 mg/L	1.5E-02 mg/L	N/A
Chlorobenzene	N	None	None	1.3E+02	1.6E+03	None	None	None	1.6E+02	None	None	1.3E+02	1.6E+03	N/A	N/A	2.9E+03
Chlorodibromomethane	Y	None	None	4.0E+00	1.3E+02	None	None	None	1.3E+01	None	None	4.0E+00	1.3E+02	N/A	N/A	4.1E+02
Chloroform	N	None	None	3.4E+02	1.1E+04	None	None	None	1.1E+03	None	None	3.4E+02	1.1E+04	N/A	N/A	2.0E+04
2-Chloronaphthalene	N	None	None	1.0E+03	1.6E+03	None	None	None	1.6E+02	None	None	1.0E+03	1.6E+03	N/A	N/A	2.9E+03
2-Chlorophenol	N	None	None	8.1E+01	1.5E+02	None	None	None	1.5E+01	None	None	8.1E+01	1.5E+02	N/A	N/A	2.8E+02
Chlorpyrifos	N	8.3E-02	4.1E-02	None	None	2.1E-02	1.0E-02	None	8.3E-02	4.1E-02	None	None	None	1.1E-01	5.6E-02	N/A

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Chromium (+3)	N	5.3E+02	6.8E+01	None	None	1.3E+02	1.7E+01	None	5.3E+02	6.8E+01	None	None	7.0E+02	9.4E+01	N/A
Chromium (+6)	N	1.6E+01	1.1E+01	None	None	4.0E+00	2.8E+00	None	1.6E+01	1.1E+01	None	None	2.1E+01	1.5E+01	N/A
Total Chromium	N	None	None	1.0E+02	None	None	None	None	None	None	1.0E+02	None	N/A	N/A	N/A
Chrysene	Y	None	None	3.8E-03	1.8E-02	None	None	1.8E-03	None	None	4.4E-02	4.9E-01	N/A	N/A	1.5E+00
Copper	N	1.2E+01	8.2E+00	1.3E+03	None	3.1E+00	2.1E+00	None	1.2E+01	8.2E+00	1.3E+03	None	1.6E+01	1.1E+01	N/A
Cyanide, Free	N	2.2E+01	5.2E+00	1.4E+02	1.6E+04	5.5E+00	1.3E+00	1.6E+03	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.9E+01	7.2E+00	2.9E+04
DDD	Y	None	None	3.1E-03	3.1E-03	None	None	3.1E-04	None	None	3.1E-03	3.1E-03	N/A	N/A	9.8E-03
DDE	Y	None	None	2.2E-03	2.2E-03	None	None	2.2E-04	None	None	2.2E-03	2.2E-03	N/A	N/A	6.9E-03
DDT	Y	1.1E+00	1.0E-03	2.2E-03	2.2E-03	2.8E-01	2.5E-04	2.2E-04	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.5E+00	1.4E-03	6.9E-03
Demeton	N	None	1.0E-01	None	None	None	2.5E-02	None	None	1.0E-01	None	None	N/A	1.4E-01	N/A
Diazinon	N	1.7E-01	1.7E-01	None	None	4.3E-02	4.3E-02	None	1.7E-01	1.7E-01	None	None	2.3E-01	2.3E-01	N/A
Dibenz(a,h)anthracene	Y	None	None	3.8E-02	1.8E-01	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
1,2-Dichlorobenzene	N	None	None	4.2E+02	1.3E+03	None	None	1.3E+02	None	None	4.2E+02	1.3E+03	N/A	N/A	2.4E+03
1,3-Dichlorobenzene	N	None	None	3.2E+02	9.6E+02	None	None	9.6E+01	None	None	3.2E+02	9.6E+02	N/A	N/A	1.8E+03
1,4-Dichlorobenzene	N	None	None	6.3E+01	1.9E+02	None	None	1.9E+01	None	None	6.3E+01	1.9E+02	N/A	N/A	3.5E+02
3,3-Dichlorobenzidine	Y	None	None	2.1E-01	2.8E-01	None	None	2.8E-02	None	None	2.1E-01	2.8E-01	N/A	N/A	8.8E-01
Dichlorobromomethane	Y	None	None	5.5E+00	1.7E+02	None	None	1.7E+01	None	None	5.5E+00	1.7E+02	N/A	N/A	5.4E+02
1,2-Dichloroethane	Y	None	None	3.8E+00	3.7E+02	None	None	3.7E+01	None	None	3.8E+00	3.7E+02	N/A	N/A	1.2E+03
1,1-Dichloroethylene	N	None	None	3.3E+02	7.1E+03	None	None	7.1E+02	None	None	3.3E+02	7.1E+03	N/A	N/A	1.3E+04
1,2-trans-dichloroethylene	N	None	None	1.4E+02	1.0E+04	None	None	1.0E+03	None	None	1.4E+02	1.0E+04	N/A	N/A	1.8E+04
2,4-Dichlorophenol	N	None	None	7.7E+01	2.9E+02	None	None	2.9E+01	None	None	7.7E+01	2.9E+02	N/A	N/A	5.3E+02
2,4-Dichlorophenoxy Acetic	N	None	None	1.0E+02	None	None	None	None	None	None	1.0E+02	None	N/A	N/A	N/A
1,2-Dichloropropane	Y	None	None	5.0E+00	1.5E+02	None	None	1.5E+01	None	None	5.0E+00	1.5E+02	N/A	N/A	4.7E+02
1,3-Dichloropropene	Y	None	None	3.4E+00	2.1E+02	None	None	2.1E+01	None	None	3.4E+00	2.1E+02	N/A	N/A	6.6E+02
Dieldrin	Y	2.4E-01	5.6E-02	5.2E-04	5.4E-04	6.0E-02	1.4E-02	5.4E-05	2.4E-01	5.6E-02	5.2E-04	5.4E-04	3.2E-01	7.7E-02	1.7E-03
Diethyl Phthalate	N	None	None	1.7E+04	4.4E+04	None	None	4.4E+03	None	None	1.7E+04	4.4E+04	N/A	N/A	8.1E+04
2,4 Dimethylphenol	N	None	None	3.8E+02	8.5E+02	None	None	8.5E+01	None	None	3.8E+02	8.5E+02	N/A	N/A	1.6E+03
Dimethyl Phthalate	N	None	None	2.7E+05	1.1E+06	None	None	1.1E+05	None	None	2.7E+05	1.1E+06	N/A	N/A	2.0E+06
Di-n-Butyl Phthalate	N	None	None	2.0E+03	4.5E+03	None	None	4.5E+02	None	None	2.0E+03	4.5E+03	N/A	N/A	8.3E+03
2,4 Dinitrophenol	N	None	None	6.9E+01	5.3E+03	None	None	5.3E+02	None	None	6.9E+01	5.3E+03	N/A	N/A	9.8E+03
2-Methyl-4,6-Dinitrophenol	N	None	None	1.3E+01	2.8E+02	None	None	2.8E+01	None	None	1.3E+01	2.8E+02	N/A	N/A	5.2E+02
2,4-Dinitrotoluene	Y	None	None	1.1E+00	3.4E+01	None	None	3.4E+00	None	None	1.1E+00	3.4E+01	N/A	N/A	1.1E+02
Dioxin +	N	None	None	5.0E-08	5.1E-08	None	None	5.1E-09	None	None	5.0E-08	5.1E-08	N/A	N/A	9.4E-08
1,2-Diphenylhydrazine	Y	None	None	3.6E-01	2.0E+00	None	None	2.0E-01	None	None	3.6E-01	2.0E+00	N/A	N/A	6.3E+00
Alpha-Endosulfan	N	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	8.9E+00	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.9E-01	7.7E-02	1.6E+02
Beta-Endosulfan	N	2.2E-01	5.6E-02	6.2E+01	8.9E+01	5.5E-02	1.4E-02	8.9E+00	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.9E-01	7.7E-02	1.6E+02
Alpha+Beta-Endosulfan	N	2.2E-01	5.6E-02	None	None	5.5E-02	1.4E-02	None	2.2E-01	5.6E-02	None	None	2.9E-01	7.7E-02	N/A
Endosulfan Sulfate	N	None	None	6.2E+01	8.9E+01	None	None	8.9E+00	None	None	6.2E+01	8.9E+01	N/A	N/A	1.6E+02
Endrin	N	8.6E-02	3.6E-02	5.9E-02	6.0E-02	2.2E-02	9.0E-03	6.0E-03	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.1E-01	5.0E-02	1.1E-01
Endrin Aldehyde	N	None	None	2.9E-01	3.0E-01	None	None	3.0E-02	None	None	2.9E-01	3.0E-01	N/A	N/A	5.5E-01
Ethylbenzene	N	None	None	5.3E+02	2.1E+03	None	None	2.1E+02	None	None	5.3E+02	2.1E+03	N/A	N/A	3.9E+03
Fluoranthene	N	None	None	1.3E+02	1.4E+02	None	None	1.4E+01	None	None	1.3E+02	1.4E+02	N/A	N/A	2.6E+02
Fluorene	N	None	None	1.1E+03	5.3E+03	None	None	5.3E+02	None	None	1.1E+03	5.3E+03	N/A	N/A	9.8E+03
Foaming Agents (MBAS)	N	None	None	5.0E+02	None	None	None	None	None	None	5.0E+02	None	N/A	N/A	N/A
Guthion	N	None	1.0E-02	None	None	None	2.5E-03	None	None	1.0E-02	None	None	N/A	1.4E-02	N/A
Heptachlor	Y	5.2E-01	3.8E-03	7.9E-04	7.9E-04	1.3E-01	9.5E-04	7.9E-05	5.2E-01	3.8E-03	7.9E-04	7.9E-04	6.9E-01	5.2E-03	2.5E-03
Heptachlor Epoxide	Y	5.2E-01	3.8E-03	3.9E-04	3.9E-04	1.3E-01	9.5E-04	3.9E-05	5.2E-01	3.8E-03	3.9E-04	3.9E-04	6.9E-01	5.2E-03	1.2E-03
Hexachlorobenzene	Y	None	None	2.8E-03	2.9E-03	None	None	2.9E-04	None	None	2.8E-03	2.9E-03	N/A	N/A	9.1E-03
Hexachlorobutadiene	Y	None	None	4.4E+00	1.8E+02	None	None	1.8E+01	None	None	4.4E+00	1.8E+02	N/A	N/A	5.7E+02
Hexachlorocyclohexane Alp	Y	None	None	2.6E-02	4.9E-02	None	None	4.9E-03	None	None	2.6E-02	4.9E-02	N/A	N/A	1.5E-01
Hexachlorocyclohexane Be	Y	None	None	9.1E-02	1.7E-01	None	None	1.7E-02	None	None	9.1E-02	1.7E-01	N/A	N/A	5.4E-01
Hexachlorocyclohexane Gamma-BHC (Lindane)	Y	9.5E-01	None	9.8E-01	1.8E+00	2.4E-01	None	1.8E-01	9.5E-01	None	9.8E-01	1.8E+00	1.3E+00	N/A	5.7E+00
Hexachlorocyclopentadiene	N	None	None	4.0E+01	1.1E+03	None	None	1.1E+02	None	None	4.0E+01	1.1E+03	N/A	N/A	2.0E+03
Hexachloroethane	Y	None	None	1.4E+01	3.3E+01	None	None	3.3E+00	None	None	1.4E+01	3.3E+01	N/A	N/A	1.0E+02
Hydrogen Sulfide	N	None	2.0E+00	None	None	None	5.0E-01	None	None	2.0E+00	None	None	N/A	2.8E+00	N/A
Indeno(1,2,3-cd)pyrene	Y	None	None	3.8E-02	1.8E-01	None	None	1.8E-02	None	None	3.8E-02	1.8E-01	N/A	N/A	5.7E-01
Iron	N	None	None	3.0E+02	None	None	None	None	None	None	3.0E+02	None	N/A	N/A	N/A
Isophorone	Y	None	None	3.5E+02	9.6E+03	None	None	9.6E+02	None	None	3.5E+02	9.6E+03	N/A	N/A	3.0E+04
Kepone	N	None	Zero	None	None	None	Zero	None	None	Zero	None	None	N/A	Zero	N/A
Lead	N	1.1E+02	1.2E+01	1.5E+01	None	2.7E+01	3.0E+00	None	1.1E+02	1.2E+01	1.5E+01	None	1.4E+02	1.6E+01	N/A
Malathion	N	None	1.0E-01	None	None	None	2.5E-02	None	None	1.0E-01	None	None	N/A	1.4E-01	N/A
Manganese	N	None	None	5.0E+01	None	None	None	None	None	None	5.0E+01	None	N/A	N/A	N/A
Mercury	N	1.4E+00	7.7E-01	None	None	3.5E-01	1.9E-01	None	1.4E+00	7.7E-01	None	None	1.9E+00	1.1E+00	N/A
Methyl Bromide	N	None	None	4.7E+01	1.5E+03	None	None	1.5E+02	None	None	4.7E+01	1.5E+03	N/A	N/A	2.8E+03
Methylene Chloride	Y	None	None	4.6E+01	5.9E+03	None	None	5.9E+02	None	None	4.6E+01	5.9E+03	N/A	N/A	1.9E+04
Methoxychlor	N	None	3.0E-02	1.0E+02	None	None	7.5E-03	None	None	3.0E-02	1.0E+02	None	N/A	4.1E-02	N/A
Mirex	N	None	Zero	None	None	None	Zero	None	None	Zero	None	None	N/A	Zero	N/A

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Nickel	N	1.7E+02	1.9E+01	6.1E+02	4.6E+03	4.2E+01	4.7E+00	4.6E+02	1.7E+02	1.9E+01	6.1E+02	4.6E+03	2.3E+02	2.6E+01	8.5E+03
Nitrate (as N)	N	None	None	1.0E+01 n	None	None	None	None	None	None	1.0E+01 rr	None	N/A	N/A	N/A
Nitrobenzene	N	None	None	1.7E+01	6.9E+02	None	None	6.9E+01	None	None	1.7E+01	6.9E+02	N/A	N/A	1.3E+03
N-Nitrosodimethylamine	Y	None	None	6.9E-03	3.0E+01	None	None	3.0E+00	None	None	6.9E-03	3.0E+01	N/A	N/A	9.5E+01
N-Nitrosodiphenylamine	Y	None	None	3.3E+01	6.0E+01	None	None	6.0E+00	None	None	3.3E+01	6.0E+01	N/A	N/A	1.9E+02
N-Nitrosodi-n-propylamine	Y	None	None	5.0E-02	5.1E+00	None	None	5.1E-01	None	None	5.0E-02	5.1E+00	N/A	N/A	1.6E+01
Nonylphenol	N	2.8E+01	6.6E+00	None	None	7.0E+00	1.7E+00	None	2.8E+01	6.6E+00	None	None	3.7E+01	9.1E+00	N/A
Parathion	N	6.5E-02	1.3E-02	None	None	1.6E-02	3.3E-03	None	6.5E-02	1.3E-02	None	None	8.6E-02	1.8E-02	N/A
PCB Total	Y	None	1.4E-02	6.4E-04	6.4E-04	None	3.5E-03	6.4E-05	None	1.4E-02	6.4E-04	6.4E-04	N/A	1.9E-02	2.0E-03
Pentachlorophenol	Y	7.1E+00	5.3E+00	2.7E+00	3.0E+01	1.8E+00	1.3E+00	3.0E+00	7.1E+00	5.3E+00	2.7E+00	3.0E+01	9.4E+00	7.2E+00	9.5E+01
Phenol	N	None	None	1.0E+04	8.6E+05	None	None	8.6E+04	None	None	1.0E+04	8.6E+05	N/A	N/A	1.6E+06
Pyrene	N	None	None	8.3E+02	4.0E+03	None	None	4.0E+02	None	None	8.3E+02	4.0E+03	N/A	N/A	7.4E+03
RadNuc - Beta Part & Phot	N	None	None	4.0E+00 n	None	None	None	None	None	None	4.0E+00 rr	4.0E+00 mre	N/A	N/A	7.4E+00
RadNuc - Gross Alpha Part	N	None	None	1.5E+01 p	None	None	None	None	None	None	1.5E+01 p	None	N/A	N/A	N/A
RadNuc - Radium 226 + 228	N	None	None	5.0E+00 p	None	None	None	None	None	None	5.0E+00 p	None	N/A	N/A	N/A
RadNuc - Uranium	N	None	None	3.0E+01	None	None	None	None	None	None	3.0E+01	None	N/A	N/A	N/A
Selenium, Total Recoverabl	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	5.0E+00	1.3E+00	4.2E+02	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.7E+01	6.9E+00	7.7E+03
Silver	N	3.0E+00	None	None	None	7.5E-01	None	None	3.0E+00	None	None	None	4.0E+00	N/A	N/A
Sulfate	N	None	None	2.5E+02 n	None	None	None	None	None	None	2.5E+02 rr	None	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	Y	None	None	1.7E+00	4.0E+01	None	None	4.0E+00	None	None	1.7E+00	4.0E+01	N/A	N/A	1.3E+02
Tetrachloroethylene	Y	None	None	6.9E+00	3.3E+01	None	None	3.3E+00	None	None	6.9E+00	3.3E+01	0.0E+00	N/A	1.0E+02
Thallium	N	None	None	2.4E-01	4.7E-01	None	None	4.7E-02	None	None	2.4E-01	4.7E-01	N/A	N/A	8.7E-01
Toluene	N	None	None	5.1E+02	6.0E+03	None	None	6.0E+02	None	None	5.1E+02	6.0E+03	N/A	N/A	1.1E+04
Total Dissolved Solids	N	None	None	5.0E+05	None	None	None	None	None	None	5.0E+05	None	N/A	N/A	N/A
Toxaphene	Y	7.3E-01	2.0E-04	2.8E-03	2.8E-03	1.8E-01	5.0E-05	2.8E-04	7.3E-01	2.0E-04	2.8E-03	2.8E-03	9.7E-01	2.8E-04	8.8E-03
Tributyltin	N	4.6E-01	7.2E-02	None	None	1.2E-01	1.8E-02	None	4.6E-01	7.2E-02	None	None	6.1E-01	9.9E-02	N/A
1,2,4-Trichlorobenzene	N	None	None	3.5E+01	7.0E+01	None	None	7.0E+00	None	None	3.5E+01	7.0E+01	N/A	N/A	1.3E+02
1,1,2-Trichloroethane	Y	None	None	5.9E+00	1.6E+02	None	None	1.6E+01	None	None	5.9E+00	1.6E+02	N/A	N/A	5.0E+02
Trichloroethylene	Y	None	None	2.5E+01	3.0E+02	None	None	3.0E+01	None	None	2.5E+01	3.0E+02	N/A	N/A	9.5E+02
2,4,6-Trichlorophenol	Y	None	None	1.4E+01	2.4E+01	None	None	2.4E+00	None	None	1.4E+01	2.4E+01	N/A	N/A	7.6E+01
2-(2,4,5-Trichlorophenoxy propionic acid (Silvex)	N	None	None	5.0E+01	None	None	None	None	None	None	5.0E+01	None	N/A	N/A	N/A
Vinyl Chloride	Y	None	None	2.5E-01	2.4E+01	None	None	2.4E+00	None	None	2.5E-01	2.4E+01	N/A	N/A	7.6E+01
Zinc	N	1.1E+02	1.1E+02	7.4E+03	2.6E+04	2.7E+01	2.7E+01	2.6E+03	1.1E+02	1.1E+02	7.4E+03	2.6E+04	1.4E+02	1.5E+02	4.8E+04

PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh} , the WLA_{hh} was imposed as the limit. Since there are no data available immediately upstream of this discharge, all other upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

- A. If all data are reported as "below detection" or $<$ the required Quantification Level (QL), and at least one detection level is $=$ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
- B. If all data are reported as "below detection", and all detection levels are $>$ the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.
 - B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
 - B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.
- C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.
 - C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
 - C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
 - C.3. If the evaluation indicates that limits are needed, but the metals data are reported as a form other than "Dissolved", then the existing data set is inadequate to make a determination and additional monitoring is required.

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

TOXLARGE – 0.099 MGD

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval (all flow tiers)
METALS					
Antimony, dissolved	7440-36-0	0.2	<5.0	a	B.1
Arsenic, dissolved	7440-38-2	1.0	<5.0	a	B.1
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	0.3, 0.3,	b,c	A
Chromium III, dissolved	16065-83-1	0.5	<5.0	a	B.1
Chromium VI, dissolved	18540-29-9	0.5	<0.01	a	A
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	8.7, 9, 14, 12, 0.005, 13, 11, 10, 9, 14, 12, 8, 10, 12, 18, 10, 9, 13, 9, 9, 18, 11, 27, 8.3, 7.8, 9, 8, 9, 9, 17, 10, 12, 9, 139, 17, 18, 18, 12, 21, 44, 28, 14, 21, 18, 19, 28, 22, 15, 17, 13, 15, 8.1, 28, 13, 13, 16, 14, 19, 25	b,c	C.2
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	<5.0	a	B.1
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	<0.20	a	A
Nickel, dissolved	7440-02-0	0.5	<5.0	a	B.1
Selenium, total recoverable	7782-49-2	2.0	<5.0	a	B.2
Silver, dissolved	7440-22-4	0.2	<5.0	a	B.2
Thallium, dissolved	7440-28-0	---	<2	a	A
Zinc, dissolved	7440-66-6	2.0	230.9, 51	a,c	C.2
PESTICIDES/PCBS					
Aldrin ^c	309-00-2	0.05	<0.05	a	A
Chlordane ^c	57-74-9	0.2	<0.05	a	A
Chlorpyrifos	2921-88-2	(5)	<1	a	B.1
DDD ^c	72-54-8	0.1	<0.05	a	A
DDE ^c	72-55-9	0.1	<0.05	a	A
DDT ^c	50-29-3	0.1	<0.05	a	A
Demeton	8065-48-3	---	<2	a	B.1
Diazinon	333-41-5	---	NEW REQUIREMENT. Needs to be sampled.	---	---
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---
Dieldrin ^c	60-57-1	0.1	<0.05	a	A
Alpha-Endosulfan	959-98-8	0.1	<0.05	a	A
Beta-Endosulfan	33213-65-9	0.1	<0.05	a	A
Alpha-Endosulfan + Beta-Endosulfan		---	<0.05	a	A
Endosulfan Sulfate	1031-07-8	0.1	<0.05	a	A
Endrin	72-20-8	0.1	<0.05	a	A

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval (all flow tiers)
Endrin Aldehyde	7421-93-4	---	<0.05	a	A
Guthion	86-50-0	---	<1.0 mg/L	a	A
Heptachlor ^C	76-44-8	0.05	<0.05	a	A
Heptachlor Epoxide ^C	1024-57-3	---	<0.05	a	A
Hexachlorocyclohexane Alpha-BHC ^C	319-84-6	---	<0.05	a	A
Hexachlorocyclohexane Beta-BHC ^C	319-85-7	---	<0.05	a	A
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	<0.05	a	A
Kepone	143-50-0	---	<10.0	a	A
Malathion	121-75-5	---	<1.0 mg/L	a	A
Methoxychlor	72-43-5	---	<0.15	a	A
Mirex	2385-85-5	---	<0.15	a	A
Parathion	56-38-2	---	<2.0	a	A
PCB Total ^C	1336-36-3	7.0	<0.05	a	A
Toxaphene ^C	8001-35-2	5.0	<0.5	a	A
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	<0.01	a	A
BASE NEUTRAL EXTRACTABLES					
Acenaphthene	83-32-9	10.0	<5.0	a	A
Anthracene	120-12-7	10.0	<5.0	a	A
Benzidine ^C	92-87-5	---	<50	a	A
Benzo (a) anthracene ^C	56-55-3	10.0	<5.0	a	A
Benzo (b) fluoranthene ^C	205-99-2	10.0	<5.0	a	A
Benzo (k) fluoranthene ^C	207-08-9	10.0	<5.0	a	A
Benzo (a) pyrene ^C	50-32-8	10.0	<5.0	a	A
Bis 2-Chloroethyl Ether ^C	111-44-4	---	<5.0	a	A
Bis 2-Chloroisopropyl Ether	108-60-1	---	<5.0	a	A
Bis-2-Ethylhexyl Phthalate ^C	117-81-7	10.0	<15.0	a	B,1
Butyl benzyl phthalate	85-68-7	10.0	<5.0	a	A
2-Chloronaphthalene	91-58-7	---	<5.0	a	A
Chrysene ^C	218-01-9	10.0	<5.0	a	A
Dibenz(a,h)anthracene ^C	53-70-3	20.0	<5.0	a	A
1,2-Dichlorobenzene	95-50-1	10.0	<5.0	a	A
1,3-Dichlorobenzene	541-73-1	10.0	<5.0	a	A
1,4-Dichlorobenzene	106-46-7	10.0	<5.0	a	A
3,3-Dichlorobenzidine ^C	91-94-1	---	<25	a	A
Diethyl phthalate	84-66-2	10.0	<5.0	a	A
Dimethyl phthalate	131-11-3	---	<5.0	a	A
Di-n-Butyl Phthalate	84-74-2	10.0	<5.0	a	A
2,4-Dinitrotoluene	121-14-2	10.0	<5.0	a	A
1,2-Diphenylhydrazine ^C	122-66-7	---	<5.0	a	A
Fluoranthene	206-44-0	10.0	<5.0	a	A
Fluorene	86-73-7	10.0	<5.0	a	A
Hexachlorobenzene ^C	118-74-1	---	<5.0	a	A

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval (all flow tiers)
Hexachlorobutadiene ^C	87-68-3	---	<5.0	a	A
Hexachlorocyclopentadiene	77-47-4	---	<10.0	a	A
Hexachloroethane ^C	67-72-1	---	<5.0	a	A
Indeno(1,2,3-cd)pyrene ^C	193-39-5	20.0	<5.0	a	A
Isophorone ^C	78-59-1	10.0	<10.0	a	A
Nitrobenzene	98-95-3	10.0	<5.0	a	A
N-Nitrosodimethylamine ^C	62-75-9	---	<5.0	a	A
N-Nitrosodi-n-propylamine ^C	621-64-7	---	<5.0	a	A
N-Nitrosodiphenylamine ^C	86-30-6	---	<10.0	a	A
Pyrene	129-00-0	10.0	<5.0	a	A
1,2,4-Trichlorobenzene	120-82-1	10.0	<5.0	a	A
VOLATILES					
Acrolein	107-02-8	---	<100	a	A
Acrylonitrile ^C	107-13-1	---	<100	a	A
Benzene ^C	71-43-2	10.0	<5.0	a	A
Bromoform ^C	75-25-2	10.0	<5.0	a	A
Carbon Tetrachloride ^C	56-23-5	10.0	<5.0	a	A
Chlorobenzene	108-90-7	50.0	<5.0	a	A
Chlorodibromomethane ^C	124-48-1	10.0	<5.0	a	A
Chloroform	67-66-3	10.0	<5.0	a	A
Dichlorobromomethane ^C	75-27-4	10.0	<5.0	a	A
1,2-Dichloroethane ^C	107-06-2	10.0	<5.0	a	A
1,1-Dichloroethylene	75-35-4	10.0	<5.0	a	A
1,2-trans-dichloroethylene	156-60-5	---	<5.0	a	A
1,2-Dichloropropane ^C	78-87-5	---	<5.0	a	A
1,3-Dichloropropene ^C	542-75-6	---	<5.0	a	A
Ethylbenzene	100-41-4	10.0	<5.0	a	A
Methyl Bromide	74-83-9	---	<10.0	a	A
Methylene Chloride ^C	75-09-2	20.0	<5.0	a	A
1,1,2,2-Tetrachloroethane ^C	79-34-5	---	<5.0	a	A
Tetrachloroethylene	127-18-4	10.0	<5.0	a	A
Toluene	10-88-3	10.0	<5.0	a	A
1,1,2-Trichloroethane ^C	79-00-5	---	<5.0	a	A
Trichloroethylene ^C	79-01-6	10.0	<5.0	a	A
Vinyl Chloride ^C	75-01-4	10.0	<5.0	a	A
RADIONUCLIDES					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
ACID EXTRACTABLES					
2-Chlorophenol	95-57-8	10.0	<5.0	a	A
2,4-Dichlorophenol	120-83-2	10.0	<5.0	a	A

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval (all flow tiers)
2,4-Dimethylphenol	105-67-9	10.0	<5.0	a	A
2,4-Dinitrophenol	51-28-5	---	<5.0	a	A
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<5.0	a	A
Nonylphenol	104-40-51	---	NEW REQUIREMENT. Needs to be sampled.	---	---
Pentachlorophenol ^c	87-86-5	50.0	<25.0	a	A
Phenol	108-95-2	10.0	<5.0	a	A
2,4,6-Trichlorophenol ^c	88-06-2	10.0	<10.0	a	A
MISCELLANEOUS					
Ammonia-N (mg/L) (Jun-Nov)	766-41-7	0.2 mg/L	Default = 9 mg/L	d	C.2
Ammonia-N (mg/L) (Dec-May)	766-41-7	0.2 mg/L	Default = 9 mg/L	d	C.2
Chloride (mg/L)	16887-00-6	---	69.7 mg/L	a	C.1
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	d	C.2
Cyanide, Free	57-12-5	10.0	<0.005 mg/L	a	A
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Hydrogen Sulfide	7783-06-4	---	<1 mg/L	a	A
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---

"Type" column indicates a category assigned to the referenced substance (see below):

A = Acid Extractable Organic Compounds
 B = Base/Neutral Extractable Organic Compounds
 M = Metals
 p = PCBs
 P = Pesticides
 R = Radionuclides
 V = Volatile Organic Compounds
 X = Miscellaneous Compounds and Parameters

The superscript "C" following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5} .

"Source of Data" codes:

a = permittee monitoring performed in December 2011
 b = data submitted on DMR
 c = permittee monitoring data performed 2002
 d = default effluent concentration

"Data Evaluation" codes:

See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

STAT.EXE RESULTS – 0.06 MGD:

<u>Ammonia-N Annual</u> Chronic averaging period = 30 WLAa = 18 WLAc = 3.3 Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 6.65831130827382 Average Weekly Limit = 6.65831130827383 Average Monthly Limit = 6.65831130827383 The data are: 9	<u>Ammonia-N Wet</u> Chronic averaging period = 30 WLAa = 47 WLAc = 17 Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 9	<u>Cadmium, Dissolved</u> Chemical = Cadmium, Dissolved Chronic averaging period = 4 WLAa = 5.1 WLAc = 1.6 Q.L. = 0.3 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 91 Expected Value = .316409 Variance = .005238 C.V. = 0.228737 97th percentile daily values = .471688 97th percentile 4 day average = .389540 97th percentile 30 day average= .341264 # < Q.L. = 0 Model used = lognormal No Limit is required for this material The data are: 0.3, 2.5, 0.45
<u>Copper, Dissolved</u> Chronic averaging period = 30 WLAa = 18 WLAc = 13 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 59 Expected Value = 15.7439 Variance = 75.2608 C.V. = 0.551024 97th percentile daily values = 36.1362 97th percentile 4 day average = 25.2458 97th percentile 30 day average= 18.7232 # < Q.L. = 1 Model used = delta lognormal A limit is needed based on Acute Toxicity Maximum Daily Limit = 18 Average Weekly Limit = 18 Average Monthly Limit = 18 The data are: 8.7, 9, 14, 12, 0.005, 13, 11, 10, 9, 14, 12, 8, 10, 12, 18, 10, 9, 13, 9, 9, 18, 11, 27, 8.3, 7.8, 9, 8, 9, 9, 17, 10, 12, 9, 139, 17, 18, 18, 12, 21, 44, 28, 14, 21, 18, 19, 28, 22, 15, 17, 13, 15, 8.1, 28, 13, 13, 16, 14, 19, 25	<u>TRC</u> Chronic averaging period = 4 WLAa = 0.029 WLAc = 0.018 Q.L. = 0.1 # samples/mo. = 30 # samples/wk. = 7 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.63263461129582E-02 Average Weekly Limit = 1.60776892986318E-0 Average Monthly Limit = 1.30478943008877E-02 The data are: 20	<u>Zinc, Dissolved</u> Chronic averaging period = 4 WLAa = 160 WLAc = 170 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 2 Expected Value = 140.95 Variance = 7152.08 C.V. = 0.6 97th percentile daily values = 342.990 97th percentile 4 day average = 234.511 97th percentile 30 day average= 169.993 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Acute Toxicity Maximum Daily Limit = 160 Average Weekly Limit = 160 Average Monthly Limit = 160 The data are: 230.9, 51

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

STAT.EXE RESULTS – 0.075 MGD:

<u>Ammonia-N Annual</u> Chronic averaging period = 30 $WLA_a = 16$ $WLAc = 2.9$ $Q.L. = 0.2$ # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 $C.V. = 0.6$ 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 5.8512432709073 Average Weekly Limit = 5.8512432709073 Average Monthly Limit = 5.8512432709073 The data are: 9	<u>Ammonia-Wet</u> Chronic averaging period = 30 $WLA_a = 39$ $WLAc = 14$ $Q.L. = 0.2$ # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 $C.V. = 0.6$ 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 9	<u>TRC</u> Chronic averaging period = 4 $WLA_a = 0.027$ $WLAc = 0.016$ $Q.L. = 0.1$ # samples/mo. = 30 # samples/wk. = 7 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 $C.V. = 0.6$ 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.34011965448517E-02 Average Weekly Limit = 1.42912793765616E-02 Average Monthly Limit = 1.15981282674557E-02 The data are: 20
<u>Cadmium, Dissolved</u> Chronic averaging period = 4 $WLA_a = 4.9$ $WLAc = 1.5$ $Q.L. = 0.3$ # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 91 Expected Value = .316409 Variance = .005238 $C.V. = 0.228737$ 97th percentile daily values = .471688 97th percentile 4 day average = .389540 97th percentile 30 day average= .341264 # < Q.L. = 0 Model used = lognormal No Limit is required for this material The data are: 0.3, 2.5, 0.45	<u>Copper, Dissolved</u> Chronic averaging period = 4 $WLA_a = 17$ $WLAc = 12$ $Q.L. = 0.5$ # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 59 Expected Value = 15.7336 Variance = 75.9638 $C.V. = 0.553953$ 97th percentile daily values = 36.2364 97th percentile 4 day average = 25.2857 97th percentile 30 day average= 18.7268 # < Q.L. = 1 Model used = delta lognormal A limit is needed based on Acute Toxicity Maximum Daily Limit = 17 Average Weekly Limit = 17 Average Monthly Limit = 17 The data are: 8.7, 9, 14, 12, 0.005, 13, 11, 10 , 9, 14, 12, 8, 10 ,12, 18, 10, 9, 13, 9, 9, 18, 11, 27, 8.3, 7.8, 9, 8, 9 , 9, 17, 10, 12, 9, 139, 17, 18, 18, 12, 21, 44, 28, 14, 21, 18, 19, 28, 22, 15, 17, 13, 15, 8.1, 28, 13, 13, 16, 14, 19, 25	<u>Zinc, Dissolved</u> Chronic averaging period = 4 $WLA_a = 150$ $WLAc = 160$ $Q.L. = 2.0$ # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 2 Expected Value = 140.95 Variance = 7152.08 $C.V. = 0.6$ 97th percentile daily values = 342.990 97th percentile 4 day average = 234.511 97th percentile 30 day average= 169.993 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Acute Toxicity Maximum Daily Limit = 150 Average Weekly Limit = 150 Average Monthly Limit = 150 The data are: 230.9 , 51

STAT.EXE RESULTS – 0.099 MGD:

Appendix B – Page 19

Fact Sheet – VPDES Permit No. VA0024147 – Fork Union Military Academy STP

<p><u>Arsenic</u> Chronic averaging period = 4 WLAa = 450 WLAc = 210 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>	<p><u>Chloride</u> Chronic averaging period = 4 WLAa = 1100 WLAc = 320 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 69.7 Variance = 1748.91 C.V. = 0.6 97th percentile daily values = 169.609 97th percentile 4 day average = 115.966 97th percentile 30 day average= 84.0619 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 69.7</p>	<p><u>Chromium III, Dissolved</u> Chronic averaging period = 4 WLAa = 700 WLAc = 94 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>
<p><u>Lead, Dissolved</u> Chronic averaging period = 4 WLAa = 140 WLAc = 16 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>	<p><u>Nickel, Dissolved</u> Chronic averaging period = 4 WLAa = 230 WLAc = 26 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 5</p>	<p><u>Selenium, Dissolved</u> Chronic averaging period = 4 WLAa = 27 WLAc = 6.9 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 10.0917660099673 Average Weekly Limit = 10.0917660099673 Average Monthly Limit = 10.0917660099673</p> <p>The data are: 5</p>
<p><u>Silver, Dissolved</u> Chronic averaging period = 4 WLAa = 4 WLAc = Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Acute Toxicity Maximum Daily Limit = 4 Average Weekly Limit = 4 Average Monthly Limit = 4</p> <p>The data are: 5</p>		

APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page • Content and format as prescribed by the VPDES Permit Manual.

Part I.A.1. **Effluent Limitations and Monitoring Requirements :**

Updates Part I.A.1. of the previous permit with the following:

- Changes were made to the format and introductory language.
- More stringent Copper limits were included.
- More stringent TRC limits were included.
- The E. coli monitoring was increased to 2/Week.
- Zinc limits were added.
- Cadmium limits were removed.
- Ammonia-N (Dec-May) limits were removed.
- Ammonia-N (Jun-Nov) limits were included.
- TKN (Jun-Nov) limits were removed.
- Hardness monitoring was included.
- Footnotes were updated to reflect current DEQ guidance and changes in the reissued permit.

Part I.A.2. **Effluent Limitations and Monitoring Requirements :**

Updates Part I.A.2. of the previous permit with the following:

- Changes were made to the format and introductory language.
- More stringent Copper limits were included.
- More stringent TRC limits were included.
- The E. coli monitoring was increased to 2/Week.
- Zinc limits were added.
- Cadmium limits were removed.
- Ammonia-N (Dec-May) limits were removed.
- Ammonia-N (Jun-Nov) limits were included.
- TKN (Jun-Nov) limits were removed.
- Hardness monitoring was included.
- Footnotes were updated to reflect current DEQ guidance and changes in the reissued permit.

Part I.A.3. **Effluent Limitations and Monitoring Requirements :**

Updates Part I.A.3. of the previous permit with the following:

- Changes were made to the format and introductory language.
- More stringent TRC limits were included.
- The E. coli monitoring was increased to 2/Week.
- Cadmium limits were removed.
- Ammonia-N (Dec-May) limits were removed.
- Ammonia-N (Jun-Nov) limits were included.
- TKN (Jun-Nov) limits were removed.
- Hardness monitoring was included.
- Footnotes were updated to reflect current DEQ guidance and changes in the reissued permit.

Part I.B. **Additional TRC And E. coli Limitations and Monitoring Requirements:** *Updates Part I.B. of the previous permit. Required by Sewage Collection and Treatment (SCAT) Regulations and 9 VAC 25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.*

Fact Sheet – VPDES Permit No. VA0024147– Fork Union Military Academy STP

- Part I.C. **Effluent Limitations and Monitoring Requirements – Additional Instructions:** *Updates Part I.C. of the previous permit.* TP, Orthophosphate, and Nitrate-Nitrite were deleted. The paragraph regarding significant digits was revised. Authorized by VPDES Permit Regulation, 9 VAC 25-31-190.J.4 and 220.I. This condition is necessary when a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. Nutrient reporting calculations were updated. §62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70.
- Part I.D.1. **95% Capacity Reopener:** *Identical to Part I.D.1. of the previous permit.* Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 4 for certain permits.
- Part I.D.2. **Indirect Dischargers:** *Identical to Part I.D.2. of the previous permit.* Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 1 for all STPs that receive waste from someone other than the owner of the treatment works.
- Part I.D.3. **Materials Handling/Storage:** *Identical to Part I.D.3. of the previous permit.* 9 VAC 25-31-280.B.2. requires that the types and quantities of “wastes, fluids, or pollutants which are ... treated, stored, etc.” be addressed for all permitted facilities.
- Part I.D.4. **O&M Manual Requirement:** *Updates Part I.D.4. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs.
- Part I.D.5. **CTC/CTO Requirement:** *Identical to Part I.D.5. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs.
- Part I.D.6. **SMP Requirement:** *Updates Part I.D.7. of the previous permit.* VPDES Permit Regulation 9 VAC 25-31-100 P, 220 B 2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9 VAC 25-32-10 *et seq.*)
- Part I.D.7. **Licensed Operator Requirement:** *Identical to Part I.D.8. of the previous permit.* The VPDES Permit Regulation 9 VAC 25-31-200 C, the Code of Virginia 54.1-2300 *et seq.*, and Rules and Regulations for Waterworks and Wastewater Works Operators 18 VAC 160-20-10 *et seq.*, require licensure of operators.
- Part I.D.8. **Reliability Class:** *Updates Part I.D.9. of the previous permit.* Required by SCAT Regulations 9 VAC 25-790.
- Part I.D.9. **Water Quality Criteria Monitoring:** *Updates Part I.D.10. of the previous permit.* State Water Control Law at 62.1-44.21 authorizes the Board to request information needed to determine the discharge’s impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility’s effluent for the substances noted in Attachment A of this VPDES permit.
- Part I.D.10. **Treatment Works Closure Plan:** *Updates Part I.D.11. of the previous permit.* Required for all STPs per the State Water Control Law at 62.1-44.18.C. and 62.1-44.15:1.1., and the SCAT Regulations at 9 VAC 25-790-450.E. and 9 VAC 25-790-120.E.3.

Fact Sheet – VPDES Permit No. VA0024147– Fork Union Military Academy STP

Part I.D.11.

Reopeners:

- a. *Updates Part I.D.13. of the previous permit:* Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
- b. *New Requirement:* 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.
- c. *Updates Part I.D.12. of the previous permit:* 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- d. *Updates Part I.D.6. of the previous permit:* Required by the VPDES Permit Regulation, 9 VAC 25-31-220.C, for all permits issued to STPs.

Part II

Conditions Applicable to All VPDES Permits: *Identical to Part II of previous permit.* VPDES Permit Regulation 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed